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COMMERCIALLY PREPARED INFANT FOODS

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COMMERCIALLY PREPARED INFANT FOODS[1]

G. J. HUCKER AND ALICE M. HUCKER

During the last few years a number of proprietary compounds prepared for use in infant feeding have appeared on the market. The demand for these products has stimulated manufacturers to greater production until a bewildering number of brands may be found designed to care for the diet under all conditions of both well and sick babies. The physician ofttimes has been unable to keep pace with the growing market and is at a loss how to give the proper advice to inquiring mothers. Altho admonished to consult their family physician by all reputable infant food manufacturers before using any of the commercially prepared compounds, many mothers take the situation into their own hands and appear at the druggists requesting any one of a large number of different brands. They may have some definite brand in mind having been advised by a friend or attracted by some well-devised advertising scheme. Little wonder that confusion exists when the brands of these prepared baby foods are legion.

The mother is besieged with many thoughts as she approaches the problem of making the best diet obtainable available for her baby. Are these prepared baby foods better than breast milk? Should breast feeding be augmented with cow's milk or should standard commercially prepared compounds made from cow's milk and modified to meet the delicate physiological requirements of the baby be secured? How many feedings and what formula should be used? These are all legitimate questions and should be referred to a physician. The feeding of babies has become a highly scientific part of modern medicine and the best advice obtainable should be secured by mothers. This fact is recognized by all reputable infant food manufacturers with a consequence that they make available to physicians only the suggested formulae to be used in connection with their products. These questions of diet do not come within the confines of this discussion and mothers are

[1] More detailed and technical information in regard to the sanitary quality of infant foods may be secured from Technical Bulletins Nos. 153 and 154 of this Station. Also, see *Jour. Dis. of Children,* **38,** *310-313. 1929.*

advised to take heed to the suggestions of the producers of these foods and to secure competent medical advice.

Another question which logically confronts the mother in search of an acceptable baby food is one of primary importance, namely, are these commercially prepared infant foods safe for use from a sanitary standpoint? This question has interested both the mother and the manufacturers, and this interest has prompted an investigation to determine if the commercially prepared foods of this type are really as safe from a hygienic standpoint as fluid cows' milk which is to be used as baby food. The thought has also been in mind that standards might be suggested which, if adopted by infant food manufacturers, would give both mothers and the manufacturers a feeling of greater confidence.

At the beginning of the study it was soon learned that the manufacturers of these baby foods were keenly interested in the sanitary quality of their products and were, for the most part, using every effort to place on the market a product which had been produced under the best possible sanitary conditions.

KINDS OF INFANT FOOD AVAILABLE

It is not the purpose here to discuss the relative merits from a nutrition standpoint of the various brands of infant food on the market nor to compare them with breast or cows' milk as a regular diet for infants. Suffice it to say, that a large percentage of the commercially prepared infant foods are made up largely of cows' milk to which various salts and other compounds have been added to make the cows' milk better adapted to both well and sick babies.

There are four groups or types of commercially prepared infant foods on the market today. Mothers should know the use of each group and why they have been made available for infant feeding.

RECONSTRUCTED INFANT FOOD

The first large group includes the so-called "reconstructed" baby foods. These foods have been especially compounded for babies under one year of age and are to be used to augment, or in place of, breast milk. They are known as reconstructed infant foods because when redissolved in the proportions designated by the attending physician they have many of the diet qualities of milk but contain additional easily digested ingredients. These ingredients are desirable for the baby's growth and development and are added to meet certain definite digestive and

nutritive requirements. These reconstructed infant foods are made up generally of powdered milk, cod liver oil, and sugar in addition to the milk sugar already present, as well as certain inorganic substances which are intended to make the mixture closely resemble breast milk.

As stated above, these reconstructed foods meet all the recognized food requirements of babies and are usually prescribed when necessary in conjunction with or to replace breast milk.

MILK MODIFIERS

The second and one of the most widely used groups of commercially prepared infant foods is the so-called "milk modifier". It is generally accepted that many babies require, if fed cows' milk to augment or replace breast milk, certain ingredients which seem necessary to the best health of the baby. These ingredients are generally sugar which is to be added to the milk in the proportions designated by the physician and in accordance with the requirements of the individual infant.

FIG. 1.—A REPRESENTATIVE COLLECTION OF COMMERCIALLY PREPARED INFANT FOODS.

A large number of different varieties of products are on the market, but each has been produced to meet certain diet requirements of babies.

Altho the milk sugar normally present in the milk may be available for digestion by the baby, physicians feel that another sugar which

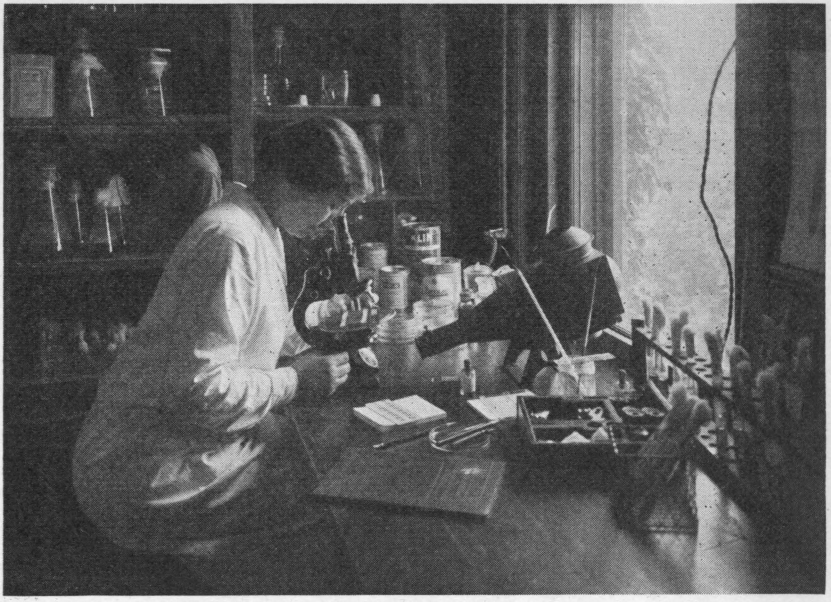

FIG. 2.—EXAMINING INFANT FOODS UNDER THE MICROSCOPE TO DETERMINE THE NUMBER OF BACTERIA PRESENT.

can be assimilated quickly should be added in certain cases. For this reason compounds have appeared on the market known thruout the trade as "modifiers". Certain babies can utilize ordinary table sugar when added to milk, while others require a sugar of a different chemical make-up, and this is generally provided in these modifiers.

PROTEIN MILK

Another group of infant foods found on the market has been designed to meet the needs of infants who have developed certain temporary complaints, particularly diarrhea. For this need, it has been shown that the protein content of the food should be materially increased and consequently "Protein Milk" has appeared on the shelves of the shops. Manufacturers of commercially prepared infant foods have felt that mothers could be better served if they were to incorporate the extra protein in the milk during the manufacturing process, thus making available a powdered milk ready for instant use by the physician and the mother. For this reason a number of protein milks may be had which are made primarily of milk to which has been added a

given amount of casein, the protein constituent of milk. This mixture is dried and powdered and the final product is in easy form for quick use and handling.

In some cases sour buttermilk is used from which a part of the whey has been removed before the addition of protein. These protein milks are prepared to be used directly or they may be boiled as a special precaution before use. Special steps in the manufacturing process are necessary to make them able to withstand boiling as the ordinary protein milk will curdle if boiled.

Certain powdered casein compounds may be secured and added to fluid milk upon the advice of a physician with the same apparent result as is secured when the protein milk is used.

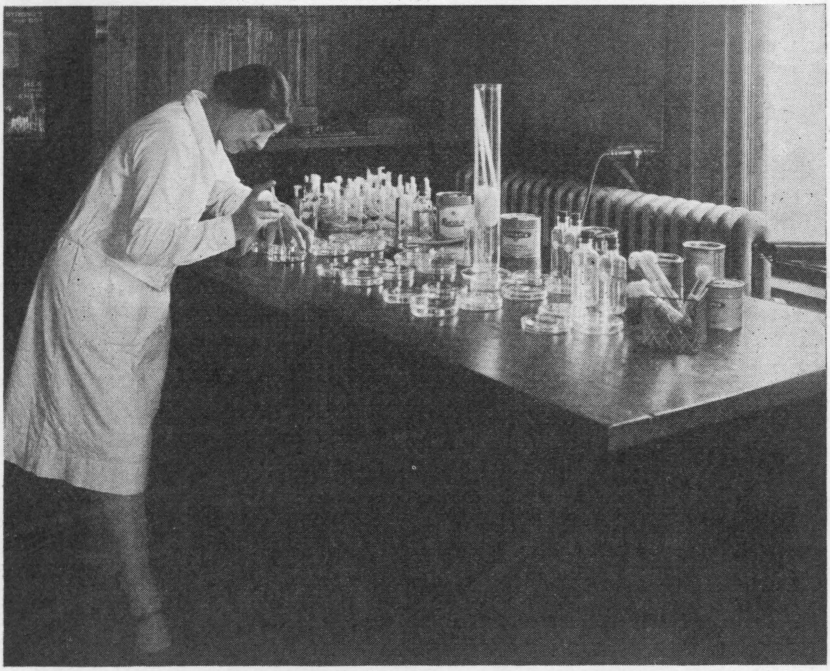

FIG. 3.—MEASURING DEFINITE AMOUNTS OF THE SUSPENDED BABY FOODS TO BE USED FOR DETERMINING THE NUMBER OF BACTERIA PRESENT.

LACTIC ACID MILK

When it becomes necessary for normal babies to be fed cows' milk, the infant must accommodate itself to the slightly different constitution of

FIG. 4.—EXAMINING SAMPLES OF COMMERCIALLY PREPARED INFANT FOODS AFTER THEY HAVE BEEN CENTRIFUGED.
The foreign material, if any is present, may be found at the bottom of the tubes.

cows' milk in relation to breast milk thru an increase of secretion of hydrochloric acid in the stomach. However, some babies fail to make this adjustment. For these infants the so-called "Lactic Acid Milk" has been made available. The use of lactic acid milk which is made up of cows' milk to which has been added chemically pure lactic acid or, the milk allowed by culture to develop its own lactic acid from the milk sugar, allows the baby to adjust itself to the diet of cows' milk. Several brands of lactic acid milk are on the market.

POWDERED, EVAPORATED, AND CONDENSED MILK

Due to the convenience of handling and in many cases the standard quality of the product, many mothers adopt for older babies one of the various brands of powdered, evaporated, or condensed milk. The unsweetened milks may be either ordinary whole milk without any modi-

fication other than the removal of water or they may have been partially skimmed. The milk in either case has been unmodified by the addition of any special foreign ingredient. Many brands of this type of milk are on the market, both as infant food and also for general consumption.

During the course of the present study, however, it has been urged that manufacturers should take greater precautions with that part of the product intended for infant use than with the brands intended primarily for cooking or general consumption, and that they should designate some particular brand of their output as infant food.

Mention should be made again that the preparation and use of these commercially prepared compounds do not supplant the use of breast and cows' milk for infant feeding. It is generally agreed that milk should serve as the basis of all infant foods. The manufacturers of

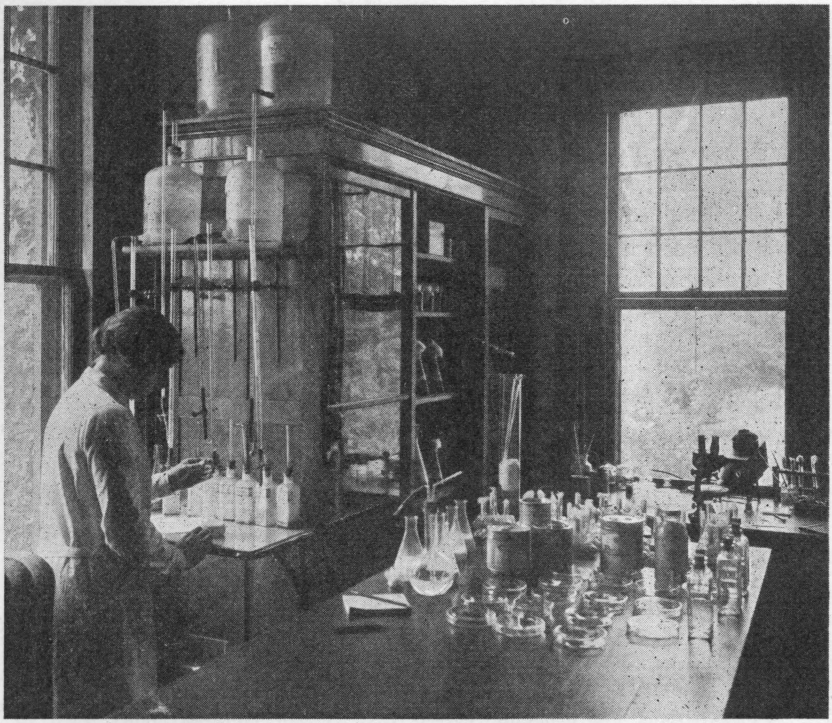

FIG. 5.—DETERMINING THE AMOUNT OF ACID IN VARIOUS BRANDS OF COMMERCIALLY PREPARED INFANT FOODS.

these foods have recognized this and have endeavored to place at the disposal of the physician and the mother either powdered milk unmodified, or with such modifications as meet the varying needs of the infant. The prepared baby food industry is a part of the dairy industry and, as such, should bear the same relation and responsibility to the mother as the producer of ordinary whole fluid milk intended for baby food.

WHAT CONSTITUTES SANITARY QUALITY IN INFANT FOOD?

If, after consultation with a physician, it is decided to augment breast feeding or cows' milk with commercially prepared infant foods or to use such compounds exclusively, the mother should feel safe in selecting any of the available brands suggested. In order to insure this safety the infant food should meet certain sanitary standards. At the outset the mother has a right to expect and should feel that the food being purchased is *clean.* Clean in this connection should include freedom from any foreign material of an objectionable nature, such as dust particles, dirt, or any other material which may detract from the palatability as well as the sanitary quality of the food. The baby food should in addition be produced from acceptable raw products and the manufacture should be carried out under clean conditions.

In addition to being clean, such foods should contain *no harmful bacteria.* Such micro-organisms should be carefully excluded. In the case of most of the reputable manufacturers of baby foods, the number of micro-organisms is reduced to a minimum during the process of manufacture. Mothers need have little fear in the matter of harmful bacteria in baby foods, as carefully controlled methods of manufacture preclude the probability of such bacteria being present. Moreover, manufacturers are constantly on their guard lest such harmful or disease-producing types gain entrance.

In addition to cleanliness and freedom from harmful bacteria, the mother may rightfully expect that infant foods purchased upon the market should contain a *minimum number of bacteria,* even tho the bacteria present may be of a harmless nature.[2] The presence of a large number of bacteria in the final product generally indicates that the supervision of the manufacturer has been lax at some point in the

[2] Pediatricians are generally agreed that certain cultured milks, such as acidophilus, etc., have value. Such prepared foods which, of necessity, contain a large number of organisms have not been included in this study.

processing. A low bacterial count is generally taken to mean that a strict sanitary supervision has been maintained thruout all the different steps in the processing of the infant food. These interpretations of bacteria counts are not always accepted, but the greater number of those interested in high-quality food products are of the opinion that freedom from excessive numbers of bacteria is a wise safety precaution.

BABY FOODS SHOULD CONTAIN NO HARMFUL BACTERIA

Above all other precautions, the mother wishes to feel assured that the infant food which she purchases is absolutely free from harmful bacteria. She has a right to expect that the producers will bend every effort to make the baby food as healthful as possible from the sanitary standpoint.

In order to secure direct evidence that the manufacturers of these infant foods are using every precaution, a number of samples of different brands were tested to learn if any harmful bacteria are present.

One of the groups of bacteria which might be present is a type known as the "hemolytic streptococci". They derive the name "hemolytic" from their power to break down the hemoglobin in the red blood cells into a colorless compound. The name "streptococcus" comes from the fact that when viewed under the microscope they may be seen as chains of small spherical cells. Altho not all species of hemolytic streptococci are harmful or disease producing, their presence should be avoided as many types of these organisms are pathogenic.

The firms manufacturing many of these brands have adopted a routine control of every batch or run to make sure that no hemolytic streptococci get into the final products.

Another of the organisms which may gain entrance in the preparation of infant foods are the organisms commonly known as the "colon group", a name given because of their universal presence in the lower digestive tract of man and animals. Repeated tests of the samples examined showed no traces of these organisms. Types of bacteria causing abortion in cattle or malta fever in humans and tuberculosis obviously cannot be present because they cannot survive the high temperatures used during the manufacturing process.

KEEPING THE NUMBER OF BACTERIA AT A MINIMUM

Some have expressed surprise to learn that any bacteria are present in commercially prepared baby foods. The method of manufacture of

such products must be such that there is no possibility of producing a *sterile* food, altho the manufacturers have succeeded in most cases in producing baby foods with an exceptionally small number of bacteria. Care should be taken not to over-emphasize the significance of the presence of small numbers of bacteria in infant foods. Generally speaking, the number present is a index of the conditions under which the product has been produced. A large number of organisms usually signifies that more care should be taken in the routine control of the various steps in the manufacturing process, while a sample containing a minimum number is, in most instances, indicative of care taken during the manufacturing process. Regardless of the feeling of many that the number of bacteria in a food should not be considered important, it is felt that until more evidence is at hand to show that the number of bacteria should be disregarded, every possible care should be taken to keep the final food as free as possible from all types of organisms. The health of the baby is *too important* to take any chances.

It should be kept in mind that so-called "certified milk" which is considered to be one of the best grades of raw milk obtainable for babies from the standpoint of freedom from bacteria is allowed a bacterial count of 10,000 per cc. This calculation is made upon a liquid basis. If the number present in baby foods is to be compared with milk counts, the number secured per gram should be divided by eight as the volume of the milk is reduced approximately eight times during the drying process. On the other hand, it must also be remembered that the milk used in commercially prepared infant foods has ordinarily been subjected to heat sometime during the processing. For this reason the number of bacteria present in certified milk cannot be directly compared with the number of bacteria present in infant foods.

The bacterial count found in commercially prepared infant foods varied from practically none to over 300,000 per gram.

CONCLUSIONS

Before taking any steps toward adopting a commercially prepared infant food either to augment or to replace breast milk as the child grows older, the mother should consult a physician as to the type of food essential and adapted to the particular infant.

The mother has a right to demand that commercially prepared infant foods should meet the highest sanitary standards. These standards should include the following:

1. The infant food should be produced under clean conditions and kept clean thruout its journey thru the processing plant to the baby.
2. There should be no harmful bacteria present.
3. The number of bacteria present should be reduced to a minimum.

The examination of a number of samples has shown that practically all of the infant foods on the market at the present time meet these standards.